#12 Appeal Brief 1/22/02 as AF/2700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Peele

Serial No. 09/317,480

Filed: May 24, 1999

For: **DYNAMIC CHANNEL ALLOCATION IN A SECTORED CELL OF A CELLULAR COMMUNICATION SYSTEM**

Attorney's Docket No. 4015-279

Persino, R.
Examiner
Group Art Unit 2681

Raleigh, North Carolina
November 27, 2001

Box AF
Commissioner for Patents
Washington, D.C. 20231

Appeal Brief

Attached is an Appeal Brief, submitted in triplicate, for the above-referenced application. Also included is a check for $320.00. If any additional fees for the Response are required, the Applicant submits that this be considered a Petition therefore, and the Commissioner is hereby authorized to charge Deposit Account 18-1167.

Respectfully submitted,

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Appeal Brief

(1) REAL PARTY IN INTEREST

The real party in interest is Ericsson, Inc., the Assignee of the present application.

(2) RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences to the best of Applicant's knowledge.

(3) STATUS OF CLAIMS

Nine (9) claims have been finally rejected by the Examiner. They are claims 1-9. Applicant appeals from all rejected claims.

The Examiner indicated in an Advisory Action of September 10, 2001 that claims 21-26 would be allowed upon submission of this Appeal Brief. The Examiner additionally indicated during an interview with Applicant's counsel that amendments to claim 27 would be entered, and would render claims 27-30 allowable. The present Appeal Brief is thus submitted on the good-faith basis that only claims 1-9 remain rejected in the application.

(4) STATUS OF AMENDMENTS

Applicant believes that all amendments have been entered.

(5) SUMMARY OF INVENTION

Modern wireless communications systems have the capacity to establish and maintain links with many mobile terminals over large areas, while utilizing a fixed number of radio frequencies. One key to this ability is the strategy of "frequency reuse," in which each frequency allocated to the wireless system is utilized multiple times, supporting multiple wireless links, or calls. One frequency reuse strategy is to divide the total coverage area into relatively small geographic units, called cells, and allocate a group of frequencies to each cell. To avoid interference at the cell boundaries, adjacent cells are allocated different frequency groups. One frequency group may be allocated to two or more cells

for concurrent use if the cells are at a sufficient geographic distance from each other to avoid interference. Such cells are called "co-channel cells," and any interference between them due to common frequency allocation is known as "co-channel interference."

It is well known that co-channel interference may be reduced by dividing each cell into sectors (*e.g.*, three 120°-wide sectors), subdividing the cell's frequency group into subgroups, and allocating a different subgroup to each sector. Since the sector antennae are directional, the frequency subgroups can be allocated such that each sector's frequency subgroup "points away" from a co-channel cell sector using the same frequency subgroup. This strategy is illustrated in Figure 2 of the Specification.

In conventional cellular communications systems that utilized sectored cells, the frequencies or channels allocated to each sector are fixed. While an orderly allocation of frequencies is necessary to achieve the reduction in co-channel interference, a fixed allocation is subject to spectral inefficiency if all of the channels in one sector of a cell are being utilized, while other channels remain available in another sector of the cell. According to the present invention, when one sector within a cell reaches a predetermined utilization threshold, and there are unused channels in another sector of the same cell, a dynamic channel allocation method reassigns channels from the available sector to the fully-loaded sector. In one embodiment, the method checks for co-channel interference with a co-channel cell prior to re-assigning the available channel to the fully-loaded sector.

Three representative embodiments of the dynamic channel allocation among sectors are disclosed: the redundant array method (or partially redundant array method), the switching method, and the frequency agility method. Briefly, the (partially) redundant array method contemplates a full (or partial) array of transceivers at each sector, with each transceiver corresponding to a frequency allocated to the cell. Channels may then be re-allocated among sectors by selectively enabling or disabling the transceivers in the relevant sectors. The switching method, on the other hand, contemplates one complete array of transceivers at the cell, with each transceiver connected to a sector antenna through a switching array. Channels may be re-allocated among sectors by switching the antennae connected to each transceiver. Finally, in the frequency agility method, each sector is provided with the transceivers corresponding to channels allocated to that sector, and additionally with one or more frequency-agile transceivers that can be tuned to a particular frequency. Channels are re-allocated among sectors by disabling a fixed transceiver in the lightly loaded sector, and tuning a frequency-agile transceiver in the fully-loaded sector to the corresponding channel. The claims at issue in the present appeal cover all three methods.

The present invention thus increases the spectral efficiency of wireless communications systems utilizing sectored cells, without increasing co-channel interference. The present invention thus allows wireless system operators to obtain both the benefits of efficient channel allocation (by utilizing a sectored cell frequency reuse scheme) and of full utilization of all of the channels allocated to

a cell (by not wasting channels allocated to a lightly loaded sector), without the concomitant detriment of spectral inefficiency.

(6) ISSUES

Whether independent claims 1 and 6 are obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 6,047,186 to Yu, *et al.* ("Yu"), in view of U.S. Patent No. 5,809,423 to Benveniste ("Benveniste")?

(7) GROUPING OF CLAIMS

Claims 1-9 should be grouped together. All of the claims stand or fall together.

(8) ARGUMENT

A. The Examiner's reliance on Yu is improper, since Yu, when considered as a whole, teaches away from the present invention. The Examiner has not considered Yu as a whole, but rather has selectively extracted elements from Yu to reject Applicant's claims.

Yu discloses a method of mapping cell sector boundaries to real-world performance characteristics, either by taking physical measurements of signal strength vs. position (*e.g.*, by "drive tests") or via computer simulation. Yu , col. 8, lines 17-22. These real-world sectors are grouped into "islands" or "regions" separated by weak connection zones. Yu, col. 9,1. 66 - col. 10, line 7. Channel groups are then assigned to cell sectors, independently within each region, by

optimizing the ratio of received signal strength to interference power within each sector. Yu, col. 15, lines 12-20. Yu thus teaches constructing cell sector boundaries that accurately reflect real-world performance characteristics, and then carefully allocating specific channel groups to each sector according to a complex, recursive algorithm so as to optimize the signal/interference performance in each region.

Not only does Yu disclose no dynamic allocation of channels among sectors, Yu inherently teaches away from the adaptive allocation of channels. Yu's invention is the computationally intensive crafting of a fixed channel allocation pattern that is tailored to the real-world performance metrics of each specific region.

The Examiner has admitted to a legally improper reliance on Yu. "[T]he examiner's use of the Yu reference was for no other purpose than to evidence the fact that it is well known in the art to sector a cell and to divide the frequency group assigned to the cell into subgroups assigned to the sectors of the cell." Advisory Action of September 10, 2001, p. 2 (emphasis added). Regardless of the veracity *vel non* of the Examiner's assertion as to what is known in the art, this is improper obviousness analysis, as a matter of law.

"One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fine*, 837 F.2d 1071,1075 (Fed. Cir. 1988). "One does not start with Claim 1 and go to the prior art to see if one can piece together the [claimed invention] from

the combination of older things." *Medtronic, Inc. v. Daig Corp.*, 221 USPQ 593, 606 (D. Minn. 1983).

The Examiner admitted in the Final Office Action, and again in the Advisory Action, to taking each limitation of Applicant's claims in isolation and, using impermissible hindsight, to picking and choosing among isolated disclosures in the cited references "for no other purpose" than to reconstruct, and thence reject, the claims. Advisory Action of September 10, 2001, p. 2, ¶ 1, *supra*. *See also* Final Office Action of June 6, 2001, p. 15 ("While Yu teaches more than this concept, the examiner only relies on that part of Yu's teaching."). The Federal Circuit has expressly condemned this practice:

> The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time. . . . From its discussion of the prior art it appears to us that the court . . . treated each reference as teaching one or more of the specific components for use in the [inventor's] system, although the [inventor's] system did not then exist. Thus the court reconstructed the [inventor's] system, using the blueprint of the [inventor's] claims. As is well established, this is legal error.

Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138-9 (Fed. Cir. 1985) (emphasis added). The *Interconnect* court went on to specifically condemn the practice of selectively extracting partial teachings from prior art references:

> 35 U.S.C. § 103 requires that obviousness be determined with respect to the invention as a whole . . . Not only must the claimed invention as a whole be evaluated, but so also must the references as a whole, so that their teachings are applied in the context of their significance to a technician at the time – a technician without our knowledge of the solution.

Id., at 1143 (emphasis added).

The legal rule that prior art references must be considered as a whole, and isolated disclosures not selectively extracted to create the applicant's invention, predates the Federal Circuit:

> References are evaluated by ascertaining the facts fairly disclosed therein as a whole. It is impermissible to first ascertain factually what appellants did and then view the prior art in such a manner as to select from the random facts of that art only those which may be modified and then utilized to reconstruct appellants' invention from such prior art.

Application of Shuman, 361 F.2d 1008, 1012 (C.C.P.A. 1966) (emphasis added).

This rule is fundamental to this Board's section 103 jurisprudence. "[C]iting references which merely indicate that isolated elements and/or features recited in the claims are known is not a sufficient basis for concluding that the combination of claimed elements would have been obvious." *Ex parte Hiyamiza*, 10 USPQ.2d 1393, 1394 (Bd. Pat. App. & Inter. 1988) (emphasis added).

When considered as a whole, Yu teaches constructing cell sector boundaries that accurately reflect real-world performance characteristics, followed by a precise allocation of specific channel groups to each sector according to a complex algorithm to optimize performance in each region. Yu expresses no concern for co-channel interference, for the relative loading among sectors, or for spectral efficiency. The complexity and computational intensity of Yu's sector channel allocation algorithm dispel any notion that Yu envisioned, contemplated, or could possibly implement the dynamic allocation of channels among sectors on an as-needed basis. In short, Yu teaches away from Applicant's invention.

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 380, (Fed. Cir. 1994). The paths taken by Yu and the Applicant – carefully crafted fixed channel allocation and dynamic, as-needed channel allocation – could not be more divergent. Yu, regardless of what limited the teaching the Examiner purports to extract from it, must be considered as a whole, and as a whole, it teaches away from Applicant's invention. Accordingly, Yu cannot properly form part of a § 103 rejection.

B. The Examiner's rejection based on Benveniste relies on argument by insufficiently substantiated analogy.

Benbeniste discloses a system for allocating channels among cells within a wireless communications system. Benbeniste, col. 1, lines 10-14. The allocation scheme is an Adaptive-Dynamic Channel Assignment (ADCA) system, col. 7, lines 48-60. In the Adaptive phase of Benbeniste's channel allocation, frequency groups are assigned to cells based not on a fixed re-use pattern, but rather according to measured or anticipated traffic loads within each cell, reallocating at up to half-hour intervals as necessary, col. 6, lines 49-65. In the Dynamic phase, one cell may borrow an unused channel from another cell as its load increases, col. 7, line 60 – col. 8, line 8. Channel borrowing is restricted by Channel Reservation, col. 8, lines 38-50, and/or Channel Re-arrangement, col. 9, lines 1-11.

The Examiner has maintained that Benbeniste's complex adaptive/dynamic system of allocating channels among cells in a system renders Applicant's invention of the dynamic re-allocation of channels among sectors in a single cell obvious – yet the Examiner has yet to provide a convincing line of reasoning why this is so. At most, the Examiner has alluded to Benbeniste solving Applicant's problem "in an abstract sense." Advisory Action of September 10, 2001, p. 2. The Examiner's rejection relies entirely on analogy – that the relationship between sectors of a cell and the parent cell is identical to the relationship between cells in a wireless network and the network. "[C]ells are fixed regions within the larger fixed region of a network. Similarly, sectors are small fixed regions with[in] the larger fixed region of a cell." Advisory Action of September 10, 2001, p. 2. That such a superficial similarity concerning geographic extent and inclusion could render a cell and a sector thereof virtually identical is beyond serious contemplation – of course it does not. To establish a similarity between the two entities sufficient to support such an obviousness-by-analogy argument requires that the Examiner provide "an explanation based on logic and sound scientific reasoning that will support a holding of obviousness." *Ex parte Levengood*, 28 USPQ2d 1300, 1301 (Bd. Pat. App. & Inter. 1993) (emphasis added).

> To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985) (emphasis added), *See also*, MPEP § 2142 ("The examiner bears the initial burden of factually supporting any prima facie case of obviousness) (emphasis added).

The Examiner has provided no factual analysis at all, and only the most superficial of arguments – far short of the legally required convincing line of reasoning based on logic and sound scientific reasoning – why the disclosure of an adaptive/dynamic allocation of frequencies among cells in a wireless communications network would lead one of ordinary skill in the art to Applicant's invention of dynamic re-allocation of channels among sectors of a cell. The Examiner has offered merely the bald and unsubstantiated assertion that "one of ordinary skill in the art would either recognize that the benefits gained by methodologies used in the cell/network relationship would analogously be achieved when utilized in the sector/cell relationship." Advisory Action of September 10, 2001, p. 3.

Yet the Examiner has offered no showing of equivalence, or even parallel, between these relationships, such as perhaps the mechanics of allocating channels in the two cases; the load monitoring requirements or processes in the two cases, or the level at which such processes occur and the communications and data exchange required to support them; the computational, switching, RF processing, and/or receiving and radiating equipment relevant to the two cases; the costs, technology, infrastructure, support, maintenance, or any of myriad

other factors and considerations that distinguish the two to one of ordinary skill in the art.[1]

Conclusion

For the reasons set forth above, all claims being appealed herein are patentably nonobvious over the cited art, and the rejections maintained by the Examiner must be reversed.

Respectfully submitted,

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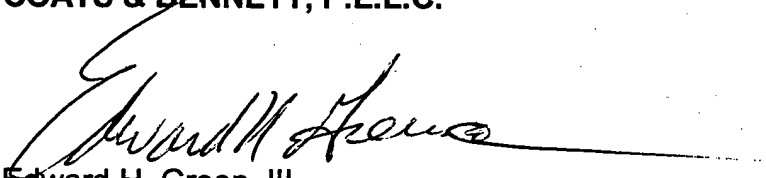
By: 

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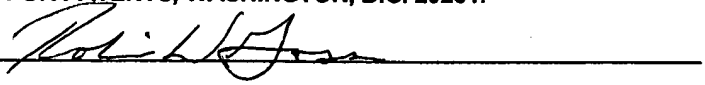
SIGNATURE 

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[1] Applicant merely offers a partial list of the vast array of differences and differing considerations between cells and sectors thereof, as seen by one of ordinary skill in the art, by way of illustration of the deficiency of the Examiner's analogy. Applicant notes that it is the Examiner's burden to provide a convincing line of reasoning based on logic and sound scientific reasoning supporting the asserted equivalence – it is not the Applicant's burden to disprove the analogy.

(9) APPENDIX

Claims

1. A method for allocating channels in a cell of a cellular communication system having a plurality of cells comprising:

   a. dividing the cell into a plurality of sectors;

   b. subdividing channels allocated to the cell into frequency subgroups;

   c. assigning the frequency subgroups to respective sectors in the cell;

   d. allocating channels within each sector to users in the corresponding sector;

   e. when the number of channels allocated in a first sector of the cell reaches a predetermined threshold, reassigning an unused channel from a second sector in the cell to the first sector.

2. The method of claim 1 further including the step of further reassigning the reassigned channel back to its original sector when the reassigned channel is demanded in the original sector.

3. The method according to claim 1 further including the step of determining whether the unused channel in the second cell is in use in another co-channel cell in the network before the unused channel is reassigned to the first sector.

4. The method of claim 3 further including the step of placing the reassigned channel on a hold back list in the co-channel cell designating channels that should be among the last to be allocated.

5. The method of claim 4 further including the step of reassigning the reassigned channel back to its original sector when the channel is demanded in the co-channel cell.

6. A method for allocating channels in a cell of a cellular communication system having a plurality of cells comprising:

a. dividing the cell into a plurality of sectors;

b. subdividing channels allocated to the cell into frequency subgroups;

c. assigning the frequency subgroups to respective sectors in the cell;

d. allocating channels within each sector to users in the corresponding sector;

e. when the number of channels allocated in a first sector of the cell reaches a predetermined threshold, determining whether unused channels are available in a second sector of the cell;

f. if an unused channel is found in the second sector, determining whether the unused channel is currently in use in another co-channel cell in the network;

g. reassigning the unused channel from the second sector in the cell to the first sector in the cell if the unused channel is not currently in use in the co-channel cell.

7. The method of claim 6 further including the step of further reassigning the reassigned channel back to its original sector when the channel is demanded in the original sector.

8. The method of claim 6 further including the step of placing the reassigned channel on a hold back list in the co-channel cell designating channels that should be among the last to be allocated.

9. The method of claim 8 further including the step of reassigning the reassigned channel back to its original sector when the channel is demanded in the co-channel cell.

[claims 10-30 are allowed]